09/508967

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SEQUENCE LISTING

(1) GENERAL INFORMATION:

(i) APPLICANT:
(A) NAME: KAROLINSKA INNOVATIONS AB
(B) STREET: TOMTEBOGATAN
(C) CITY: STOCKHOLM
(E) COUNTRY: SWEDEN
(F) POSTAL CODE (ZIP): 171 77
(G) TELEPHONE: +46-(0)8-728 65 10
(H) TELEFAX: +46-(0)8-303423

(ii) TITLE OF INVENTION: MALARIA POLYPEPTIDES

(iii) NUMBER OF SEQUENCES: 1

(iv) COMPUTER READABLE FORM:
(A) MEDIUM TYPE: Floppy disk
(B) COMPUTER: IBM PC compatible
(C) OPERATING SYSTEM: PC-DOS/MS-DOS
(D) SOFTWARE: PatentIn Release #1.0, Version #1.30 (EPO)

(2) INFORMATION FOR SEQ ID NO: 1:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 2228 amino acids
(B) TYPE: amino acid
(C) STRANDEDNESS: single
(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: peptide

(iii) HYPOTHETICAL: NO

(v) FRAGMENT TYPE: N-terminal

(ix) FEATURE:
(A) NAME/KEY: Binding-site
(B) LOCATION:79..86

(ix) FEATURE:
(A) NAME/KEY: Binding-site
(B) LOCATION:102..107

(ix) FEATURE:
(A) NAME/KEY: Binding-site
(B) LOCATION:201..207

(ix) FEATURE:
(A) NAME/KEY: Binding-site
(B) LOCATION:221..232

(ix) FEATURE:
(A) NAME/KEY: Binding-site
(B) LOCATION:341..350

(ix) FEATURE:
(A) NAME/KEY: Binding-site
(B) LOCATION:377..382

(ix) FEATURE:
(A) NAME/KEY: Binding-site
(B) LOCATION:411..418

(ix) FEATURE:
(A) NAME/KEY: Binding-site
(B) LOCATION:533..549

(ix) FEATURE:
(A) NAME/KEY: Binding-site
(B) LOCATION:569..576

(ix) FEATURE:
(A) NAME/KEY: Binding-site
(B) LOCATION:646..651

(ix) FEATURE:
(A) NAME/KEY: Binding-site
(B) LOCATION:688..693

(ix) FEATURE:
(A) NAME/KEY: Binding-site
(B) LOCATION:941..949

(ix) FEATURE:
(A) NAME/KEY: Binding-site
(B) LOCATION:1032..1039

(ix) FEATURE:
(A) NAME/KEY: Binding-site
(B) LOCATION:1152..1159

(ix) FEATURE:
(A) NAME/KEY: Binding-site
(B) LOCATION:1170..1175

(ix) FEATURE:
(A) NAME/KEY: Binding-site
(B) LOCATION:1232..1239

(ix) FEATURE:
(A) NAME/KEY: Binding-site
(B) LOCATION:1771..1777

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 1:

Met Ala Thr Ser Gly Gly Ser Gly Gly Thr Gln Asp Glu Asp Ala Lys
1 5 10 15

His Val Leu Asp Glu Phe Gly Gln Lys Val His Asp Glu Val His Gly
20 25 30

Glu Ala Lys Asn Tyr Val Ser Glu Leu Lys Gly Ser Leu Ser Leu Ala
35 40 45

Ser Ile Leu Gly Glu Thr Ala Phe Thr Val Lys Ser Met Gln Thr Glu
50 55 60

Ser Lys Tyr Thr Glu Leu Ile Glu Ala Asn Ser Lys Arg Asn Pro Cys
65 70 75 80

Lys Lys Asp Gly Lys Gly Asn Asp Val Asp Arg Phe Ser Val Lys Glu
85 90 95

Gln Ala Gly Tyr Asp Asn Lys Lys Met Lys Cys Ser Asn Gly Met Thr
100 105 110

Cys Ala Pro Phe Arg Arg Leu His Leu Cys Asn Lys Asn Phe Pro Asn
115 120 125

Met Asn Ser Asn Asp Ser Ser Lys Ala Lys His Asp Leu Leu Ala Glu
130 135 140

Val Cys Met Ala Ala Lys Tyr Glu Gly Glu Ser Ile Lys Thr His Tyr
145 150 155 160

Pro Lys Tyr Asp Ser Lys Tyr Pro Gly Ser Asp Phe Pro Met Cys Thr
165 170 175

Met Leu Ala Arg Ser Phe Ala Asp Ile Gly Asp Ile Ile Arg Gly Arg
180 185 190

Asp Leu Tyr Leu Gly Asn Lys Lys Lys Lys Gln Asn Gly Lys Glu Thr
195 200 205

Glu Arg Glu Lys Leu Glu Gln Lys Leu Lys Glu Ile Phe Lys Lys Ile
210 215 220

His Asp Asn Leu Lys Asp Lys Glu Ala Gln Lys Arg Tyr Asn Gly Asp
225 230 235 240

Glu Asp Pr Asn Phe Tyr Lys Leu Arg Glu Asp Trp Trp Thr Ala Asn
245 250 255

Arg Glu Thr Val Trp Gly Ala Met Thr Cys Ser Lys Glu Leu Asp Asn
260 265 270

Ser Ser Tyr Phe Arg Ala Thr Cys Asn Asp Thr Gly Gln Gly Pro Ser
275 280 285

Gln Thr His Asn Lys Cys Arg Cys Asp Lys Asp Lys Gly Ala Asn Ala
290 295 300

Gly Lys Pro Lys Ala Gly Asp Gly Asp Val Thr Ile Val Pro Thr Tyr
305 310 315 320

Phe Asp Tyr Val Pro Gln Tyr Leu Arg Trp Phe Glu Glu Trp Ala Glu
325 330 335

Asp Phe Cys Arg Lys Lys Lys Lys Lys Leu Glu Asn Leu Glu Lys Gln
340 345 350

Cys Arg Gly Lys Asp Lys Ser Asp Glu Tyr Arg Tyr Cys Ser Arg Asn
355 360 365

Gly Tyr Asp Cys Glu Gln Thr Ile Ser Arg Lys Gly Lys Val Arg Met
370 375 380

Gly Lys Gly Cys Thr Asp Cys Phe Phe Ala Cys Gly Ser Tyr Glu Asn
385 390 395 400

Trp Ile Asp Asn Gln Arg Lys Gln Phe Asp Lys Gln Lys Lys Tyr Thr
405 410 415

Lys Glu Ile Ser Asp Gly Gly Gly Arg Lys Lys Arg Ala Val Gly Gly
420 425 430

Thr Thr Lys Tyr Glu Gly Tyr Glu Lys Ser Phe Tyr Glu Lys Leu Lys
435 440 445

Asn Asp Gly Tyr Gly Thr Val Asp Ala Phe Leu Gly Leu Leu Asn Asn
450 455 460

Glu Lys Ala Cys Lys Asp Ile Thr Asp Gly Gly Lys Ile Asn Phe Lys
465 470 475 480

Glu Val Asn Ser Gly Gly Gly Val Val Gly Gly Gly Ser Gly Gly Thr
485 490 495

Ser Gly Ala Ser Gly Thr Asn Asp Glu Asn Lys Gly Thr Phe Tyr Arg
500 505 510

Ser Glu Tyr Cys Gln Pro Cys Pr Asp Cys Gly Val Gln His Lys Gly
515 520 525

Gly Asn Gln Trp Glu Arg Lys Thr Lys Val Lys Lys Met Arg Trp Ser
530 535 540

Lys Leu Tyr Lys Pro Ile Asn Gly Lys Met Val Leu Leu Leu Lys Ser
545 550 555 560

Leu Lys Val Val Lys Asp Met Met Ile Leu Lys Lys Asn Trp Lys Glu
565 570 575

Phe Cys Leu Thr Gln Asn Ser Ser Asp Gly Ser Val Gly Ser Val Val
580 585 590

Thr Thr Gly Ala Ser Gly Gly Asn Ser Glu Lys Lys Glu Leu Tyr Asp
595 600 605

Glu Trp Lys Cys Tyr Lys His Asn Glu Val Gln Lys Val Asn Val Gln
610 615 620

Gly Glu Val Glu Glu Asp Asp Asp Glu Leu Lys Gly Ala Gly Gly Leu
625 630 635 640

Cys Ile Leu Pro Asn Pro Lys Lys Asn Lys Glu Val Ser Glu Ala Lys
645 650 655

Ser Gln Asn Asn His Ala Asp Ile Gln Lys Thr Phe His Asp Phe Phe
660 665 670

Tyr Tyr Trp Val Ala His Met Leu Lys Asp Ser Ile His Trp Arg Thr
675 680 685

Lys Arg Leu Lys Ser Cys Ile Ser Asp Gly Lys Thr Met Lys Cys Arg
690 695 700

Asn Gly Cys Asn Lys Lys Cys Asp Cys Phe Glu Lys Trp Val Lys Gln
705 710 715 720

Lys Glu Thr Glu Trp Lys Pro Ile Lys Asp His Phe Lys Thr Gln Glu
725 730 735

Gly Ile Pro Glu Gly Tyr Tyr Phe Thr Thr Leu Glu Leu Ile Leu Lys
740 745 750

Leu Gln Phe Leu Lys Glu Asp Thr Glu Glu Asn Thr Glu Asn Ser Leu
755 760 765

Asp Ala Glu Glu Ala Glu Glu Leu Lys His Leu Gln Lys Ile Leu Lys
770 775 780

Leu Glu Asn Glu Asn Asn Leu Ala Val Val Asn Ala Gly Thr Glu Gln
785 790 795 800

Lys Thr Leu Met Asp Lys Leu Leu Asn His Glu Leu Asn Asp Ala Thr
805 810 815

Lys Cys Lys Asp Cys Pro Leu Pro Glu Glu Asp Lys Ser Arg Gly Arg
820 825 830

Ser Ala Asp Pro S r Pro Asp Il Phe Ile Pro Arg Pro Glu Glu Lys
835 840 845

Glu Asp Asp Glu Asn Glu Asp Asp Asp Glu Asp Glu Val Arg Asp Asp
850 855 860

Glu Glu Thr Ala Lys Glu Thr Thr Glu Gly Ser Ala Thr Asp Thr Thr
865 870 875 880

Thr Ser Leu Asp Val Cys Pro Ile Val Gly Lys Val Leu Thr Lys Asp
885 890 895

Asn Glu Ser Leu Gln Asp Ala Cys Ser Leu Lys Tyr Gly Gly Asn Asn
900 905 910

Ser Arg Leu Gly Trp Arg Cys Val Thr Pro Ser Gly Glu Pro Thr Thr
915 920 925

Ser Ser Asp Lys Asn Gly Ala Ile Cys Val Pro Pro Arg Arg Arg Arg
930 935 940

Leu Tyr Ile Lys Lys Ile Val Asp Trp Ala Thr Lys Thr Glu Ser Pro
945 950 955 960

Gln Ala Ser Gly Ser Glu Ala Ser Ser Thr Ser Gly Ser Thr Thr Pro
965 970 975

Pro Asp Ser Lys Glu Ala Leu Leu Lys Ala Phe Val Glu Ser Ala Ala
980 985 990

Ile Glu Thr Phe Phe Leu Trp His Arg Tyr Lys Glu Glu Lys Lys Ala
995 1000 1005

Val Ala Gln Glu Gly Ala Gly His Gly Leu Pro Arg Val Glu Glu Gly
1010 1015 1020

Ser Pro Glu Tyr Asp Pro Glu Asp Lys Leu Lys Glu Gly Lys Ile Pro
1025 1030 1035 1040

Asp Gly Phe Leu Arg Gln Met Phe Tyr Thr Leu Gly Asp Tyr Arg Asp
1045 1050 1055

Ile Leu Phe Ser Gly Ser Asn Asp Thr Thr Ser Val Ser Lys Asp Thr
1060 1065 1070

Pro Ser Ser Ser Asn Asp Asn Leu Lys Asn Ile Val Leu Leu Ala Ser
1075 1080 1085

Gly Ser Thr Glu Gln Glu Arg Glu Lys Met Asn Lys Tyr Lys Glu Ile
1090 1095 1100

Lys Asn Phe Arg Lys Cys Ser Thr Glu Arg Ser Ala Pro Asn Leu Val
1105 1110 1115 1120

Ser His Pro Gln Thr Trp Trp Glu Asn Asn Gly Lys Tyr Ile Trp His
1125 1130 1135

Gly Met Val Cys Ala Leu Thr Ser Lys Asp Lys Ile Ala Lys Gly Val
1140 1145 1150

Glu Lys Lys Pro Gln Lys Ile Glu Asn Pro Glu Asn Leu Trp Asp Glu
1155 1160 1165

Ala Asn Lys Lys Pro Lys Pro Pro Gln Tyr Gln Tyr Thr Asn Val Lys
1170 1175 1180

Leu Asp Glu Asn Ser Gly Thr Ser Pro Arg Thr Thr Gln Thr Gln Ala
1185 1190 1195 1200

Ser Ser Asp Asn Thr Pro Thr Thr Leu Thr His Phe Val Lys Arg Pro
1205 1210 1215

Thr Tyr Phe Arg Trp Phe Glu Glu Trp Gly Glu Ser Phe Cys Arg Glu
1220 1225 1230

Arg Lys Lys Arg Leu Lys Gln Ile Lys Val Asp Cys Lys Val Glu Asn
1235 1240 1245

Gly Asp Val Gly Arg Cys Ser Gly Asp Gly Glu Ala Cys Asp Ser Ile
1250 1255 1260

Ser Thr His Asp Tyr Ser Thr Val Pro Ser Phe Asn Cys Pro Gly Cys
1265 1270 1275 1280

Gly Lys His Cys Ser Ser Tyr Arg Lys Trp Ile Glu Arg Lys Lys Ile
1285 1290 1295

Glu Phe His Lys Gln Ser Asn Ala Tyr Gly Gln Gln Lys Thr Asp Ala
1300 1305 1310

Thr Arg Asn Asn Gly Asn Thr Phe Asp Lys Glu Phe Cys Lys Thr Leu
1315 1320 1325

Glu Thr Trp Pro Asp Ala Ala Lys Phe Leu Glu Arg Leu Lys Asn Gly
1330 1335 1340

Pro Cys Lys Thr Asn Lys Glu Tyr Gly Gly Asp Asp Ile Asp Phe Glu
1345 1350 1355 1360

Lys Asp Ser Lys Thr Phe Gln His Thr Glu Tyr Cys Gly Pr Cys Pro
1365 1370 1375

Lys Phe Lys Thr Asn Cys Gln Asn Gly Asn Cys Gly Val Ser Gly Leu
1380 1385 1390

Asn Gly Asn Cys Asp Gly Asp Lys Ser Ile Asp Ala Lys Glu Ile Ala
1395 1400 1405

Lys Met Arg Ser Ser Thr Thr Asp Val Val Met Arg Val Ser Asp Asn
1410 1415 1420

Asp Thr Asn Thr Phe Glu Gly Asp Asp Leu Lys Asp Ala Cys Gln His
1425 1430 1435 1440

Ala Asn Ile Phe Lys Gly Ile Arg Lys Asp Val Trp Lys Cys Gly Tyr
1445 1450 1455

Val Cys Gly Val Asp Ile Cys Glu Gln Thr Asn Ile Asn Glu Arg Thr
1460 1465 1470

Asp Gly Lys Glu Tyr Ile Gln Ile Arg Ala Leu Phe Lys Arg Trp Val
1475 1480 1485

Glu Asn Phe Leu Glu Asp Tyr Asn Lys Ile Asn Asp Lys Ile Ser His
1490 1495 1500

Cys Ile Lys Lys Gly Glu Gly Ser Lys Cys Ile Asn Gly Cys Glu Lys
1505 1510 1515 1520

Asn Ser Lys Cys Leu Glu Lys Trp Ile Glu Lys Lys Ile Ala Glu Trp
1525 1530 1535

Glu Asn Ile Lys Lys Arg Phe Asn Asp Gln Tyr Glu Asn Lys Asp Gln
1540 1545 1550

Pro Asp Tyr Asn Val Lys Ser Ile Leu Glu Glu Leu Ile Pro Lys Ile
1555 1560 1565

Ala Val Val Asn Asp Gln Asp Asn Val Ile Lys Leu Cys Val Phe Glu
1570 1575 1580

Asn Ser Lys Gly Cys Thr Leu Ile Ser Asn Thr Gln Asn Asn Lys Glu
1585 1590 1595 1600

Asn Asp Ala Ile Asp Cys Met Leu Lys Lys Leu Gly Val Lys Ala Lys
1605 1610 1615

Asn Cys Pro Gly Lys Pro Ser Gly Glu Lys Gln Ser Asp Cys Lys Glu
1620 1625 1630

Pro Pro Pro Leu Pro Asp Glu Glu Asp Gln Asn Pro Glu Glu Asn Thr
1635 1640 1645

Leu Glu Pro Pro Lys Phe Cys Pro Pro Thr Thr Gln Pro Pro Glu Glu
1650 1655 1660

Lys Gly Gly Glu Thr Cys Gly Asn Lys Glu Glu Lys Lys Asp Glu Lys
1665 1670 1675 1680

Lys Glu Glu Ser Glu Glu Pro Ala Lys Glu Glu Ser Gly Pro Ala Ala
1685 1690 1695

Glu Glu Pro Ala Pro Thr Ala Glu Ser Glu Glu Thr Glu Thr Asn Phe
1700 1705 1710

Pro Glu Pro Pro Gly Thr Gly Pro Ala Ala Pro Pro Ser Thr Pro Ala
1715 1720 1725

Pro Pro Thr Pro Asp Thr Pro Pro Pro Leu Arg Pro Gln Ala Asp Glu
1730 1735 1740

Pro Phe Asp Ser Thr Ile Leu Gln Thr Thr Ile Pro Phe Gly Val Ala
1745 1750 1755 1760

Leu Ala Leu Gly Ser Ile Ala Phe Leu Phe Leu Lys Lys Lys Thr Lys
1765 1770 1775

Ala Ser Val Gly Asn Leu Phe Gln Ile Leu Gln Ile Pro Lys Ser Asp
1780 1785 1790

Tyr Asp Ile Pro Thr Leu Lys Ser Ser Asn Arg Tyr Ile Pro Tyr Val
1795 1800 1805

Ser Asp Arg Tyr Lys Gly Lys Thr Tyr Ile Tyr Met Glu Gly Asp Ser
1810 1815 1820

Asp Glu Asp Lys Tyr Ala Phe Met Ser Asp Thr Thr Asp Val Thr Ser
1825 1830 1835 1840

Ser Glu Ser Glu Tyr Glu Glu Leu Asp Ile Asn Asp Ile Tyr Val Pro
1845 1850 1855

Gly Ser Pro Lys Tyr Lys Thr Leu Ile Glu Val Val Leu Glu Pro Ser
1860 1865 1870

Gly Asn Asn Thr Thr Ala Ser Gly Lys Asn Thr Pro Ser Asp Thr Arg
1875 1880 1885

Asn Asp Ile Gln Asn Asp Gly Ile Pro Ser Ser Lys Ile Thr Asp Asn
1890 1895 1900

Glu Trp Asn Gln Leu Lys Lys Glu Phe Ile Ser Asn Met Leu Gln Asn
1905 1910 1915 1920

Gln Pro Asn Asp Val Pro Asn Asp Tyr Thr Ser Gly Asn Ser Ser Thr
1925 1930 1935

Asn Thr Asn Ile Thr Thr Thr Ser Arg His Asn Val Asp Asn Asn Thr
1940 1945 1950

Asn Thr Thr Met Ser Arg Asp Asn Met Glu Glu Asn Leu Leu Leu Pro
1955 1960 1965

Ser Ile His Asp Gly Asn Leu Tyr Ser Gly Glu Glu Tyr Ser Tyr Asn
1970 1975 1980

Val Asn Met Val Asn Ser Met Asn Asp Ile Pro Ile Asn Arg Asp Asn
1985 1990 1995 2000

Asn Val Tyr Ser Gly Ile Asp Leu Ile Asn Asp Ser Leu Ser Gly Gly
2005 2010 2015

Lys Pro Ile Asp Ile Tyr Asp Glu Val Leu Lys Arg Lys Glu Asn Glu
2020 2025 2030

Leu Phe Gly Thr Glu Asn Thr Lys Arg Thr Ser Thr Gln Asn Val Ala
2035 2040 2045

Lys Thr Thr Asn Ser Asp Pro Ile His Asn Gln Leu Glu Leu Phe His
2050 2055 2060

Lys Trp Leu Asp Arg His Arg Asp Met Cys Glu Lys Trp Lys Asn Lys
2065 2070 2075 2080

Glu Asp Ile Leu Asn Lys Leu Lys Glu Glu Trp Asn Lys Glu Asn Ile
2085 2090 2095

Asn Asn Ser Gly Lys Thr Tyr Asn Ser Asp Asn Lys Pro Ser His Asn
2100 2105 2110

His Val Leu Asn Thr Asp Val Ser Ile Gln Ile Asp Met Asp Asn Pro
2115 2120 2125

Lys Thr Lys Asn Glu Ile Thr Asn Met Asp Thr Asn Gln Asp Lys Ser
2130 2135 2140

Thr Met Asp Thr Ile Leu Asp Asp Leu Glu Lys Tyr Asn Asp Pro Tyr
2145 2150 2155 2160

Tyr Tyr Asp Phe Tyr Glu Asp Asp Ile Ile Tyr His Asp Val Asp Val
2165 2170 2175

Glu Lys Ser Ser Met Asp Asp Ile Tyr Val Asp His Asn Asn Val Thr
2180 2185 2190

Ser Asn Asn Met Asp Val Pro Thr Lys Met His Ile Glu Met Asn Ile
2195 2200 2205

Val Asn Asn Lys Lys Glu Ile Phe Glu Glu Glu Tyr Pro Ile Ser Asp
2210 2215 2220

Ile Trp Asn Ile
2225